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(71) Applicant

Arthur Edward Thomas Limited (United Kingdom),  
26 Mill Race Close, Lisvane, Cardiff, Glamorgan, S Wales

(72) Inventor

Arthur Edward Thomas

(74) Agent and/or Address for Service

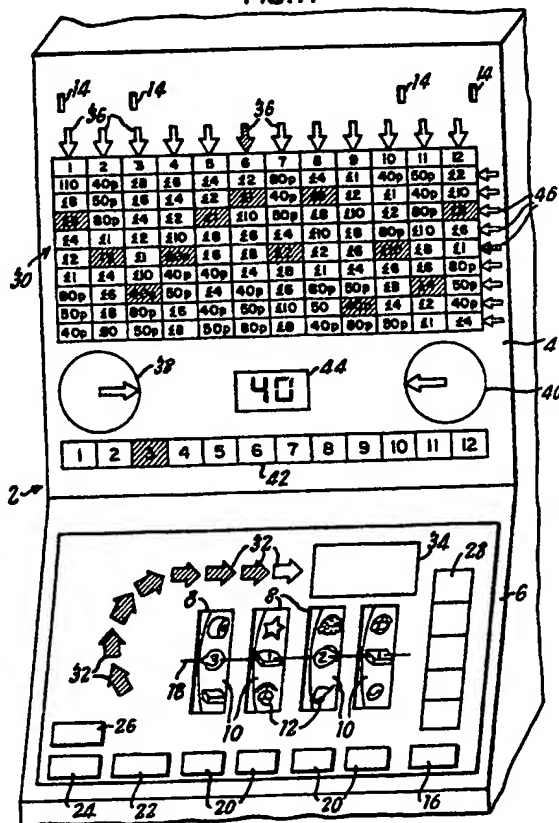
R G C Jenkins & Co,  
12-15 Fetter Lane, London EC4A 1PL

(54) Gaming machine

(57) A gaming machine has a win recorder display 30 which shows the credit values awarded as a result of winning a number of previous games. On certain occasions, a recall mode is entered whereby a user has the opportunity to win one of the displayed results.

The machine also has a display 44 indicating the number of games played since the earliest of the indicated results was awarded, to facilitate an appreciation of the past performance of the machine.

FIG.1.

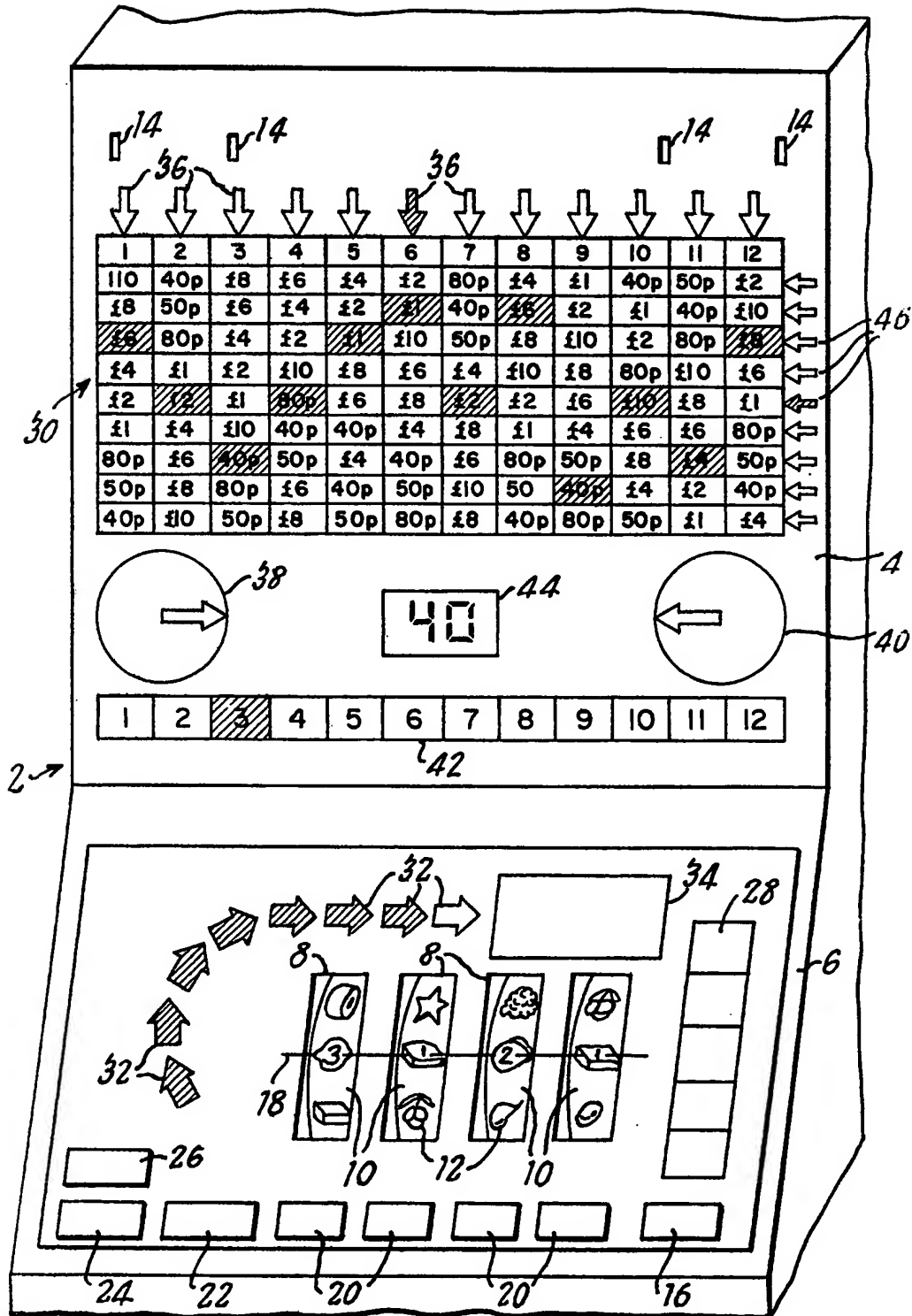


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FIG. 1.



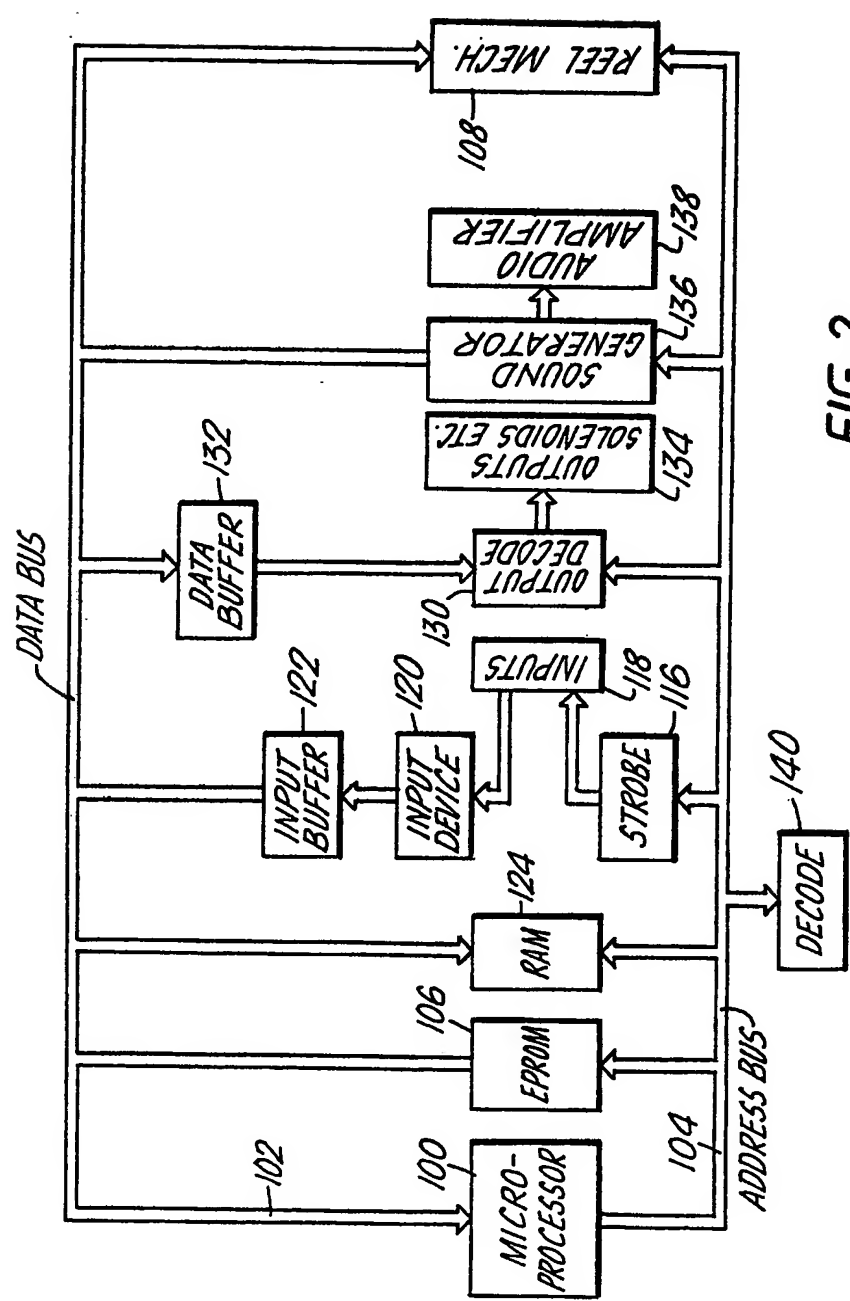


FIG. 2.

## SPECIFICATION

### Gaming machines

- 5 This invention relates to gaming machines, which term is used herein to refer to any device by means of which a user can play a game and, depending upon the results of the game, obtain a credit value. The machine preferably pays out cash and/or tokens in an amount corresponding to the credit value.

- In the art, those machines which pay out only cash are referred to as "gaming machines". Herein, however, the term gaming machine is used in a generic sense, as the invention is applicable also to other types of machines such as those known as "amusement with prize" machines, which pay out both cash and tokens. The invention is particularly but not exclusively applicable to machines known as "fruit machines", which incorporate symbol-carrying reels which are spun during the playing of a game so as to alter in a random or pseudo-random manner the combination of symbols which can be viewed by the user. The invention is also applicable to machines which incorporate other forms of display, such as a panel carrying symbols which are selectively illuminated during the playing of a game, or a video display screen which displays simulated reels or other symbols such as playing cards. Patent Specification GB-A-2,117,155, for example, describes a machine to which the present invention can be applied.

- Generally, when playing these types of machines, a game can result in any of several different types of winning result, and a credit value accorded to the user on achieving a win depends upon which of the types of winning result he has achieved.

- It would be desirable to provide a gaming machine which is of enhanced attractiveness to a potential player, so as to increase the use of the machine.

- In accordance with one aspect of the present invention there is provided a gaming machine which has a display for indicating to the user the value of the winning result achieved most recently during the playing of a plurality of previous games.

- In accordance with another aspect of the invention, a gaming machine has a display for indicating to the user the individual values of previously-achieved winning results, the display preferably also indicating to the user the order in which these winning results were achieved. Preferably, these results include the most-recent winning result.

- In either of these aspects of the invention, the display is preferably operational all the time (i.e. whenever the machine is powered), but instead may be operational only at selected times such as in response to a specific operation by the user or when the machine

enters a particular playing mode, as will be explained further below. Preferably the indication produced by the display is updated in response to further winning results being achieved. Also, there may be occasions on which the indications to be displayed are cleared, so that no indications are given until a further winning result has been achieved.

- The machine is preferably also operable to indicate the number of games played since the last winning result was achieved, or if more than one winning result is displayed the machine may alternatively indicate the total number of games played since the earliest of the indicated winning results.

- Both the above aspects of the invention provide the user, either perpetually or on certain occasions, with an indication of at least the recent history of the behaviour of the machine. This increases the player's confidence in the fact that the machine is behaving in a fair manner, particularly if several previous winning results are displayed and/or the number of games played since the most recent winning result (or the number of games played in order to accumulate several winning results) is indicated. Also, by showing the values of winning results actually achieved over a number of games, the player can evaluate more readily the expected overall performance of the machine than if he were merely presented with, for example, a numerical value indicating as a percentage the average ratio of the winning values to the deposited cash.

- In addition, certain users tend to believe that their chances of obtaining a winning result either increase or decrease depending upon the recent behaviour of the machine. These users would be more encouraged to use the machine if they were provided with an indication that this recent behaviour has been, in their view, favourable.

- According to a further aspect of the invention, which is preferably combined with one or both of the above-mentioned aspects, a gaming machine is operable to indicate a favourable result achieved in a previous game, and is selectively operable during the course of a game to enter a "recall" mode in which the player is accorded, or has an opportunity to obtain, a result dependent on the indicated result.

- A game would normally be initiated by the insertion of a coin, and would involve a main play operation to determine whether or not the player achieves a winning result. In a machine according to this aspect of the invention, the recall mode, when it occurs, could take place before, during, after or instead of the main play operation. Preferably, the recall mode is entered in dependence on the result of the main play operation.

- Preferably, the favourable result is the credit value awarded as a result of a win. Instead, however, it may be a bonus feature, such as

the opportunity to index or "nudge" one or more reels in a manner which is well-known in the field of "fruit machines".

In the preferred embodiment, the value of the most recent winning result is displayed by the machine, and on random or pseudo-random occasions the recall mode is entered so the player has the opportunity to be credited with this win value. The win value is preferably displayed all the time by way of encouragement to play the machine.

More preferably, the player has the opportunity on random or pseudo-random occasions, when the recall mode is entered, to win a selected one or more of a plurality of win values each corresponding to a winning result achieved in a previous game. Preferably all these earlier win values are displayed as an encouragement to use the machine. The selection of the win value to be accorded may be done randomly or pseudorandomly, or under the user's control, or according to a predetermined sequence.

According to a still further aspect of the invention, a gaming machine has a display to indicate in a sequence a plurality of results which can be won by a user, and means to update the indicated sequence. The results may be winning credit values, which increment a credit count when achieved. Alternatively, they could be bonus features, such as the opportunity to "nudge" reels.

Preferably, this aspect of the invention is combined with one or more of those set out above. Thus, each of the series of possible winning results may correspond to a result achieved in a previous game.

It is envisaged that the sequence in which the results are indicated may correspond to the order in which the results are presented for display. In other words, the machine will periodically display a new result, and this will be added to the end of the indicated sequence. Assuming that, before the new result is added to the display, a maximum number of results is being indicated, then as the new result is added all the other results will be shifted down in sequence by one position, the oldest of the displayed results being lost.

In such an arrangement, the selection of a result to be awarded to a player from the indicated sequence may be carried out in a variety of ways, e.g. randomly or pseudo-randomly. After one of the results is awarded, the display may be cleared, although this is not essential.

Instead, the results can be awarded in the sequence in which they are displayed so that each time a result is awarded it is cancelled from the display and the remaining results are shifted upwardly by one in the sequence. In this way, the indicated sequence would correspond to the order in which the results are presented for display, and the order in which the results can be won.

As a further alternative, the results may be awarded in the displayed sequence, but added to the display in a random or pseudo-random manner. Thus, at any given time, the machine may be arranged so that the user can win the first of the indicated sequence of results, following which the remaining results are shifted upwardly by one in the sequence. This may continue until all the results in the original sequence have been won, following which a completely new sequence of randomly determined results is displayed.

The display may contain a number of rows or columns of display areas, each display area when activated indicating one of a number of different win values or bonus features. Each row or column has one of its display areas activated so that a selected result is displayed by the row or column. The rows or columns are arranged in sequence. To update the display, the possible results in the rows or columns are each displayed in the adjacent row or column.

As an alternative to using rows or columns each formed by a set of display areas, there may be a single set of display areas each of which can produce an alterable (possibly numeric) display to indicate different results.

Preferably, the gaming machine is operable to award other winning results, the indicated sequence of results being awarded by way of a bonus, e.g. on random or pseudo-random occasions, or possibly when certain symbols are displayed by the reels of a fruit machine.

An arrangement embodying the invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a gaming machine in accordance with the invention, and

Figure 2 is a block diagram of the circuitry of the machine.

The specific embodiment to be described is a version of the well-known "fruit machine". Many examples of such machines are readily available, and the way in which they operate is well-known to those familiar with the art.

Referring to Figure 1, the machine 2 has a vertical facia 4 and an inclined facia 6. The facia 6 has four apertures 8, which reveal portions of the circumferences of four reels 10 which are mounted for rotation about a common horizontal axis. The reels carry symbols such as those shown at 12 on their peripheries, some of the symbols being visible through the apertures 8.

The machine can be played by inserting a coin or a token through an appropriate one of several slots 14.

After the user has inserted a coin or token, a game may be started. This is achieved by pressing a start button 16. This causes the four reels 10 to spin, which is preferably achieved by using a stepper motor for each reel. The reels then stop spinning, their final

positions being determined in a random or pseudo-random manner. If the reels are positioned such that certain symbols are aligned along a win line 18, the user is credited with a win value, which in this machine results in the paying out of coins in an amount corresponding to the win value.

Occasionally, a "hold" feature is provided whereby the user is given the opportunity to press one or more hold buttons 20, which will prevent, during the subsequent reel-spinning operation, the spinning of each reel associated with a hold button which has been pressed. There is a cancel button 22 for cancelling the selection of reels using the hold buttons to permit a different selection before the reel-spinning operation.

A "gamble" feature is provided each time the user obtains a winning result, whereby the user can choose either to collect his winnings by pressing a collect button 24 or to enter a gamble mode, as a result of which his win value may be increased or decreased, by pressing a gamble button 26.

Occasionally the user is awarded a "nudge" operation whereby, after a reel-spinning operation, he can selectively "nudge" or index each of the reels 10 to attempt to achieve a winning result. The total number of permitted nudges is indicated by a display 28.

The operation of the machine as described so far is conventional.

The vertical facia 4 of the machine has a win recorder display 30. This comprises columns numbered from 1 to 12. Each column comprises a number of display areas each of which can be selectively illuminated by a respective lamp behind the facia 4, and each of which displays a respective one of the possible win values. By selective illumination of the lamps, each column displays a win value achieved during a previous game. The win values are displayed in sequence so that the left-most column (column 1) shows the most-recently achieved win value, column 2 shows the win value achieved before that, etc.

Each time a further win is achieved as a result of the spinning of the reels 10, the indications in the columns 1 to 11 are shifted to the adjacent column on the right, and the latest win value is displayed by column 1.

On certain occasions, a recall mode is entered. In the particular embodiment illustrated, this is achieved in dependence upon the results of the reelspinning operation. Some of the symbols 12 have numbers superimposed on them. After the reels have been spun, any numbers superimposed on the symbols on the win line 18 are totalled. The total is displayed, in the illustrated embodiment by illuminating a corresponding number of display arrows 32. If the total is equal to or greater than a predetermined number (in this case eight), a display region 34 is illuminated to indicate that the recall mode has been entered.

If the predetermined number is not reached, the total is cleared before a new game is commenced. On random or pseudo-random occasions, the machine instead stores this total, and keeps illuminated the corresponding number of arrows 32, so that the total of the numbers on the win line following the next reel-spinning operation is added to the previous total to increase the chances of entering the recall mode.

The vertical facia 4 has a column indicator formed by a plurality of display arrows 36 each of which can be illuminated by a respective lamp to indicate a respective one of the columns of the win recorder display 30.

Once the recall mode has been entered, the display arrows 36 are illuminated in turn at a rapid rate for a random or pseudo-random period of time, following which only one of the arrows 36 remains illuminated. In this way, one of the twelve columns is selected. The machine could then be arranged automatically to credit the user with a win value equal to that displayed by the selected column.

In the illustrated embodiment, however, the user is first given the opportunity to alter the selected column. He can achieve this by using a right-shift button 38 or a left-shift button 40, which shift the selected column to the adjacent left or right column, respectively. The maximum number of shift operations is determined randomly or pseudo-randomly, and displayed on a shift indicator 42.

After the final selection has been made, the collect button 24 is pressed and the win value displayed in the selected column is paid out or credited to the user. Alternatively, the machine may be arranged to enable the user to gamble that win value by use of the gamble button 26.

Instead of the above arrangement involving the display arrows 36, the machine could be so arranged that the user is always awarded the win value displayed by, for example, the last column (i.e. column 12). In this way, the win recorder display 30 would indicate the sequence in which the winning results were awarded in previous games (which corresponds to the sequence in which they are presented for display), as well as the sequence in which they can be won again.

The vertical facia 4 has a digital display 44 which indicates the number of games played since the earliest of the wins displayed (i.e. that in column 12) was achieved. This assists the user in assessing the overall behaviour of the machine using the win recorder display 30. The display 44 is of course updated after each game.

At the end of the recall mode, the win values displayed by the win recorder display 30 and the number displayed by the display 44 are cleared. This allows the display 44 to perform the additional function of indicating how many games have been played since the

last time the recall mode was entered.

- The machine of the illustrated embodiment is also operable to award the player, on random or pseudorandom occasions, a bonus feature which involves the use of a row indicator formed by a plurality of display arrows 46, each of which can be illuminated by a respective lamp to indicate a row of the win recorder display 30. When the bonus feature is brought into operation, the arrows 46 are illuminated in turn for a period selected on a random or pseudo-random basis in order to select one of the rows. It will be appreciated that any one of the rows may display none, one or more than one of the win values achieved in earlier games. The bonus feature results in the player being credited with the total of all the win values on the selected line of the win recorder display 30.
- It is preferred that the display regions corresponding to respective win values are ordered in different ways for different columns. This is particularly preferred when the bonus feature described above is provided, because it means that several wins achieved using the bonus feature would be likely to include wins of different values. Even without the bonus feature, though, it is desirable because it results in a more even distribution of the indicated win values over the area of the win recorder display 30, instead of having the indicated win values concentrated in a region of the display 30 associated with the more frequent lower-value wins.
- The machine of the illustrated embodiment also has a jackpot feature, whereby on random or pseudo-random occasions the player is credited with the total of all the win values displayed by the win recorder display 30.
- The win recorder display 30 may be cleared following the bonus feature and/or the jackpot feature.

- Referring to Figure 2, the operation of the machine 2 is under the control of a microprocessor 100 connected to data and address buses 102 and 104, respectively. The way in which the microprocessor 100 operates is determined by a program stored in a nonvolatile memory 106, such as an EPROM, connected to the data and address buses 102 and 104.
- The data and address buses 102 and 104 are also connected to a reel mechanism 108, which incorporates the reels 10 referred to above.
- By applying appropriate addresses on the address bus 104, and by transmitting appropriate data on the data bus 102, the microprocessor 100 can control the number of pulses delivered to the driver motors of each of the reels and thereby cause the reels to rotate by a predetermined amount. Also the positions of the reels can be determined by data delivered to the data bus 102 by the reel mechanism 108.

- The address bus 104 is connected to a de-

vice 116 for strobing the inputs 118 of the machine 2. The inputs 118 include the above-mentioned switches 16, 20, 22, 24, 26, 38 and 40, and connections to a coin and token validator which generates signals indicating the value of inserted coins and tokens.

- Upon actuation of one of the inputs 118, an input device 120 delivers, via an input buffer 122, data to the bus 102 to indicate to the microprocessor 100 that a switch has been actuated or a coin or token has been inserted.

- A random access memory 124 coupled to the address buses 102 and 104 is operable, during use, to store such information as the positions of the reels 10 and the amount of accumulated credit. The memory 124 also records the values of a predetermined number of successive wins, for use in controlling the display 30.

- An output decode device 130 is coupled to the address bus 104 and transmits data received from the address bus 102 via a data buffer 132 to output device 134, including solenoids which are actuated to dispense coins and tokens, lamps on the machine to indicate different modes of operation, the lamps used for illuminating the arrows 32, 36 and 46, the displays 26, 30 and 34 and the indicator 42, and the circuit used to drive the digital display 44.

- A sound generator 136 is coupled to the buses 102 and 104 so that the microprocessor can cause the generator to generate audio signals which are delivered to an amplifier 138 and then to a speaker (not shown).

- An address decoder 140 is coupled to the address bus 104, and is arranged to enable the devices selected by the microprocessor 100 for transmission or reception of data by means of enable lines (not shown).

- Numerous features can be added, and modifications made, to the embodiment described above. Some of these are set out below:

1. Whenever a win value indicated on the win recorder display 30 is credited to the user during the recall mode, the reels 10 could be spun to the positions which they had when the indicated win was achieved. This would require the memory 124 to store not only the win values, but also the reel positions.

2. The machine could be arranged to display not only win values in the win recorder display 30, but also the reel positions, which again would require the memory 124 to store these positions. This would be particularly desirable if the win recorder display 30 can display electrically alterable symbols e.g.

- if it is a video display, possibly one incorporating a CRT.

3. If the machine is of a type whereby the main play operation is carried out using a display, such as a CRT, which shows electrically alterable symbols, the same display could also incorporate the win recorder display 30.

4. In addition to or instead of displaying the

previously-achieved win values and allowing the player an opportunity to win those values again, the machine could be arranged to display other favourable results such as the winning of a predetermined number of "nudges", the winning of an opportunity to use the "hold" feature, etc.

5 The selection of one of a plurality of earlier wins during the recall mode can be carried out in different ways. For example, the user may be allowed to pick any of the displayed earlier wins, without restriction.

10 Alternatively, he may be required to use his skill, by for example causing the arrows 36 to illuminate in turn in rapid succession, and allowing the user to stop this operation at a chosen instant.

6. The machine may be arranged to accord, on a random or pseudo-random basis, bonus win values which are added to the win values indicated by the win recorder display 30.

For example, each column may have supplementary display regions which are illuminated in dependence upon whether the machine accords that column a bonus win value. If that column is then selected in the recall mode, the user is credited with the total of the previous win value indicated by the column and the bonus win value indicated by that column.

25 This is an example of various arrangements in which the win value credited to a player in the recall mode is different from but based at least in part on a previous win value.

7. It is not necessary to clear the displays 30 and 44 after the recall mode has finished.

In fact, it may be desirable to avoid this in order for the machine always to display a large number of previous win values, which may enhance its attractiveness to potential users. If desired, that column containing the result which has been won during the recall mode can be cleared. The results in subsequent columns, if any, can be shifted along to close the gap thus created, if desired. This modification has the disadvantage that the display 30 no longer provides an accurate indication of the behaviour of the machine over the number of games indicated by the display 44.

8. The win values indicated by the display 30 may be those resulting only from the main play operations involving the spinning of the reels 10. Alternatively, they may also take into account modifications of those values caused for example by using the gamble mode feature, and if desired may also include additional results achieved in other ways.

For example, assuming that the win recorder display 30 is not cleared after the recall mode, then the win value achieved as a result of the recall mode may itself be entered on the display 30.

9. The gamble mode can be extended to apply to any of the features described above, either at the user's option or without giving the user a choice. For example, the user may

be allowed an opportunity to gamble the number of permitted shift operations displayed by the indicator 42, or the amount won as a result of the recall mode. Once a column of the display 30 has been selected, the user may opt for a gamble mode in the hope that this will result in a different column associated with a greater win value being selected. It may be possible for a plurality of columns to be simultaneously selected, and the user may be given the option of gambling in the hope of increasing the number of simultaneously selected columns.

10. The recall mode could be entered in a variety of different ways, for example in response to a particular symbol or combination of symbols being displayed by the reels 10, or as one of a series of possible results of entering the gamble mode after having achieved a winning result following the spinning of the reels 10.

11. Instead of having the display 30 in operation all the time, it may be brought into operation only on entry into the recall mode. Alternatively, a push-button switch may be provided to allow the user to bring the display 30 into operation whenever he wishes.

12. Instead of the machine actually paying out cash or tokens to the value credited to the user, it could instead simply display the credit value so that the user can collect cash or goods having a value corresponding to the indicated credit from the owner of the establishment in which the machine is situated.

13. In the above embodiment, the win values indicated by the display 30 correspond to values actually won in previous games.

Instead, the win values may have no relationship to previous games. Each value could for example be determined on a random or pseudorandom basis. New values can be added to the display 30 in sequence or alternatively the display 30 could be filled simultaneously with a plurality of randomly or pseudorandomly determined new values.

#### CLAIMS

1. A gaming machine which is operable to indicate a result achieved in a previous game, and which is selectively operable to enter a recall mode in which a player can obtain a result dependent upon the indicated previous result.

2. A machine as claimed in claim 1, wherein the indicated result corresponds to a credit value accorded to a player in the previous game.

3. A machine as claimed in claim 2, arranged to indicate the most recently achieved winning result.

4. A machine as claimed in claim 2 or claim 3, arranged to indicate a plurality of previously achieved results.

5. A machine as claimed in claim 4, having a display arranged to indicate the results in a



sequence corresponding to that in which they were awarded.

6. A machine as claimed in claim 5, operable to update the display each time a further  
5 result is achieved.

7. A machine as claimed in any one of claims 4 to 6, having means for indicating the number of games played since the earliest of the indicated previous results was won.

10 8. A machine as claimed in any one of claims 4 to 7, which is operable during the recall mode to select one of the indicated results and to award to the player a result dependent on the selected one of the indicated  
15 results.

9. A machine as claimed in claim 8, arranged such that the selection from the indicated results is dependent upon an operation carried out by the player.

20 10. A machine as claimed in any one of claims 4 to 9, wherein the display is formed by a plurality of rows or columns each having a plurality of display regions for displaying respective results so that a particular result can  
25 be displayed by a row or column by activating one of the respective display regions.

11. A machine as claimed in claim 10, wherein the display regions corresponding to respective results are ordered in different  
30 ways in different rows or columns.

12. A machine as claimed in claim 10 or claim 11, wherein the machine is operable to award a bonus win based on the sum of the results indicated by a line of activated display  
35 regions extending transverse to the rows or columns.

13. A machine as claimed in any preceding claim, having a plurality of mechanical or simulated reels which can be spun to play a game, the result of the game being dependent upon the positions of the reels following the spinning operation.  
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14. A machine as claimed in claim 13, wherein the machine is operable to enter the recall mode in dependence upon the positions of the reels following a spinning operation.  
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15. A gaming machine substantially as herein described with reference to the accompanying drawings.

50 16. A gaming machine which has a display for indicating to a player the value of the winning result achieved most recently during the playing of a plurality of previous games.

17. A gaming machine having a display for indicating to a player the individual values of a plurality of previously-achieved winning results.  
55

18. A gaming machine having a display to indicate in a sequence a plurality of results which can be won by a player, the machine  
60 being operable to update the indicated sequence.